

### Patent Claims

1. Liquid-crystalline medium having a helically twisted structure comprising a nematic component and an optically active component, characterised in that

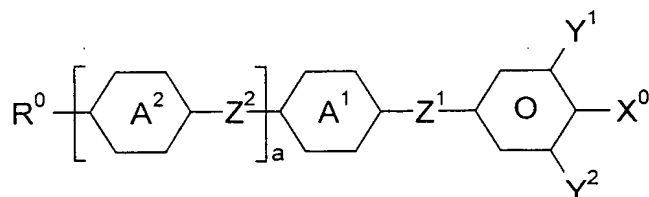
the optically active component comprises one or more chiral compounds whose helical twisting power and concentration are selected in such a way that the helical pitch of the medium is  $\leq 1 \mu\text{m}$ , and

the nematic component comprises one or more compounds containing a 3,4,5-trifluorophenyl group.

2. Liquid-crystalline medium having a helically twisted structure comprising a nematic component and an optically active component, characterised in that

the optically active component comprises one or more chiral compounds whose helical twisting power and concentration are selected in such a way that the helical pitch of the medium is  $\leq 1 \mu\text{m}$ , and

the nematic component comprises one or more compounds of the formula I

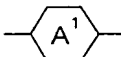
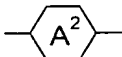


in which

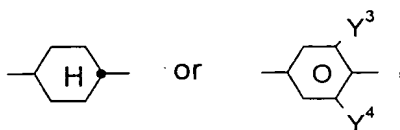
$\text{R}^0$  denotes H or an alkyl or alkenyl radical having 1 to 20 C atoms which is unsubstituted, monosubstituted by CN or  $\text{CF}_3$  or at least monosubstituted by halogen, where, in addition, one or more  $\text{CH}_2$  groups in these

radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -CO-O-, -O-CO-, -O-CO-O-, -CH=CH- or -C≡C- in such a way that O atoms are not linked directly to one another,

5

 and  each, independently of one another, denote

10



Y¹ to Y⁴ each, independently of one another, denote H or F,

15

Z¹ and Z² each, independently of one another, denote -O-, -S-, -CO-, -COO-, -OCO-, -S-CO-, -CO-S-, -OCH₂-, -CH₂O-, -SCH₂-, -CH₂S-, -CF₂O-, -OCF₂-, -CF₂S-, -SCF₂-, -CH₂CH₂-, -CF₂CH₂-, -CH₂CF₂-, -CF₂CF₂-, -CH=CH-, -CF=CH-, -CH=CF-, -CF=CF-, -C≡C- or a single bond,

20

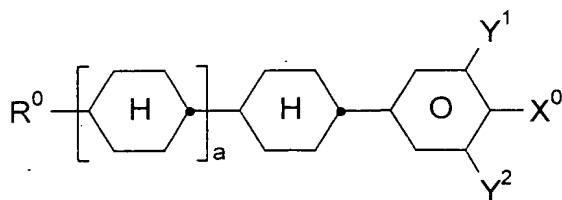
X⁰ denotes F, Cl, halogenated alkyl, alkenyl or alkoxy having 1 to 6 C atoms, and

25

a denotes 0 or 1.

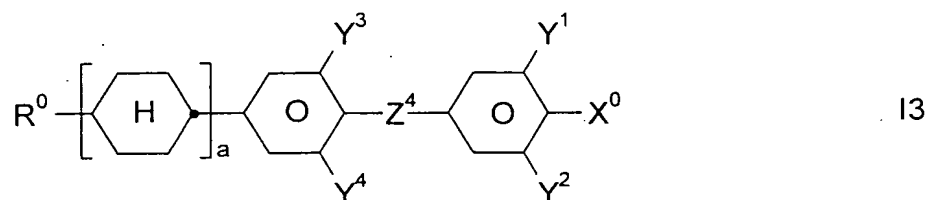
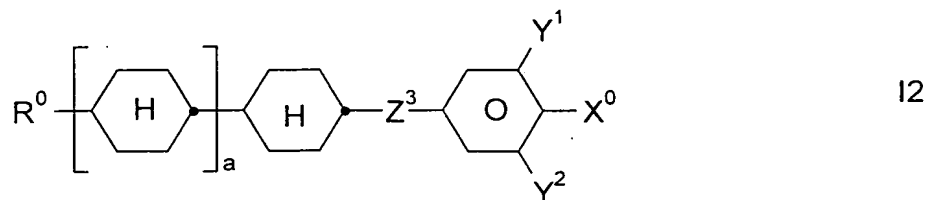
3. Medium according to Claim 2, characterised in that it comprises one or more compounds selected from the following formulae

30



11

35



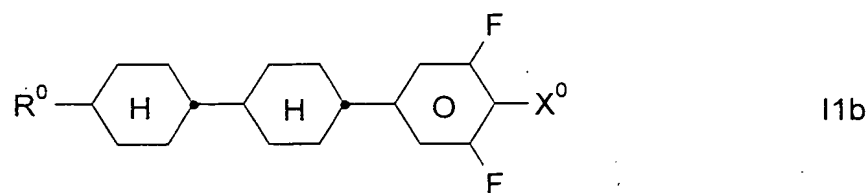
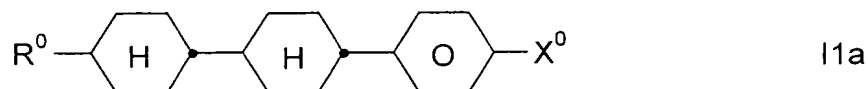
in which  $R^0$ ,  $X^0$ ,  $Y^1$ ,  $Y^2$ ,  $Y^3$ ,  $Y^4$  and  $a$  have the meaning indicated in Claim 2,

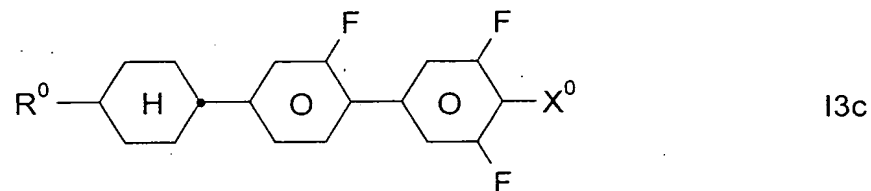
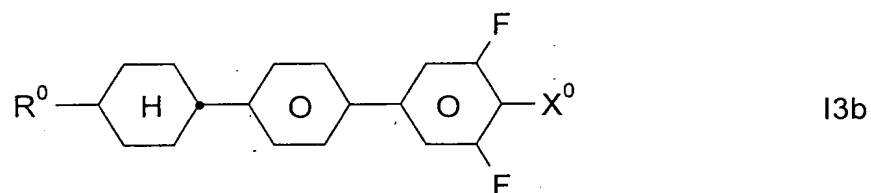
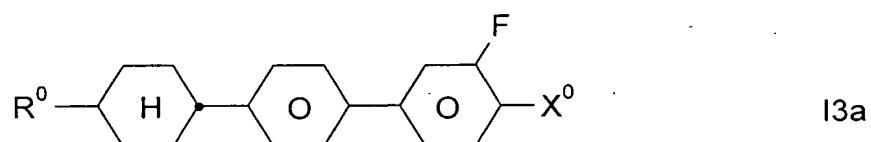
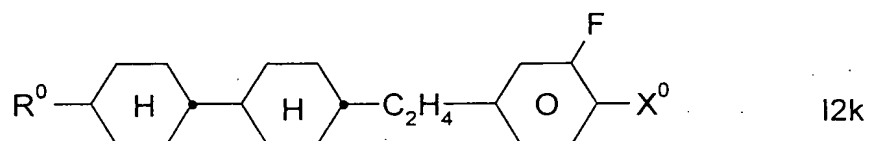
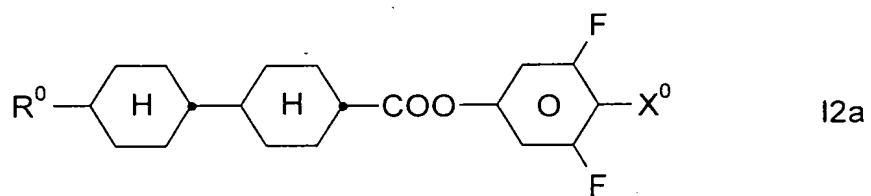
$R^0$  preferably denotes n-alkyl, alkoxy, fluoroalkyl, alkenyl or oxaalkenyl, each having up to 9 C atoms,

$Z^3$  in each case, independently of one another, denotes COO,  $C_2H_4$ ,  $CF_2O$  or  $C_2F_4$ , and

$Z^4$  in each case, independently of one another, denotes COO,  $CF_2O$ ,  $C_2F_4$  or a single bond.

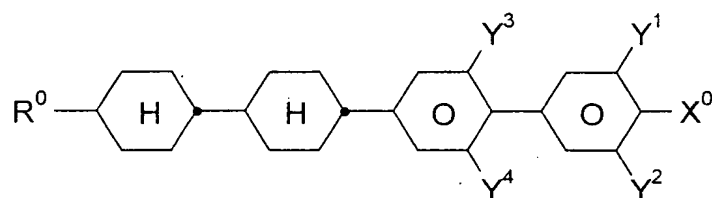
4. Medium according to Claim 2 or 3, characterised in that it comprises one or more compounds selected from the following formulae





in which  $R^0$  and  $X^0$  have the meaning indicated in Claim 2, and  $X^0$  in the formula I1a preferably denotes  $OCF_3$  and in the formulae I1b, I2a, I2k, I3a, I3b and I3c preferably denotes F.

- 30 5. Medium according to at least one of Claims 2 to 4, characterised in that it comprises one or more compounds of the following formula



II

in which  $R^0$ ,  $X^0$ ,  $Y^1$ ,  $Y^2$ ,  $Y^3$  and  $Y^4$  have the meaning indicated in Claim 2.

6. Medium according to at least one of Claims 2 to 5, characterised in that it comprises more than 50% of one or more compounds containing a 3,4,5-trifluorophenyl group.
7. Medium according to at least one of Claims 2 to 6, characterised in that the nematic component comprises
  - 5 to 50% of compounds of the formula I1,
  - 5 to 45% of compounds of the formula I2,
  - 10 to 65% of compounds of the formula I3,
  - 3 to 40% of compounds of the formula II.
8. Medium according to at least one of Claims 1 to 7, characterised in that it has a reflection wavelength in the range from 400 to 800 nm.
9. Medium according to at least one of Claims 1 to 8, characterised in that it comprises one or more dyes.
10. Use of a medium according to at least one of Claims 1 to 9 for electro-optical, laser-optical or nonlinear-optical purposes.
11. Electro-optical liquid-crystal display containing a medium according to at least one of Claims 1 to 9.

12. Electro-optical liquid-crystal display according to Claim 11, characterised in that it is a cholesteric, SSCT, PSCT or flexoelectric display.

5 13. Electro-optical liquid-crystal display according to Claim 11 or 12, characterised in that it is an active-matrix display.

14. Active laser material or resonator for laser applications, containing a CLC medium according to at least one of Claims 1 to 9.

10 15. Laser arrangement containing a medium according to at least one of Claims 1 to 9 or an active laser material or a resonator according to Claim 14.

15

20

25

30

35